# ANOMALOUS COMPRESSION BEHAVIOUR OF CORDIERITE

Mirwald, P. W.[1], Miletich, R.[2] & Loerting, T.[3]

[1]Inst. für Mineralogie und Petrographie, Univ. Innsbruck, Innrain 52f, A-6020 Innsbruck, Austria
[2] Inst. für Mineralogie und Kristallographie, Univ. Wien, Althanstrasse 14, A-1090 Wien, Austria
[3]Inst. für Physikalische Chemie, Univ. Innsbruck, Innrain 52a, A-6020 Innsbruck, Austria
e-mail:.peter.mirwald.@uibk.ac.at.

An increasing number of observations indicate that oxidic compounds, such as water/ice (MIRWALD, 2010), hydrates (DYADIN et al., 1999), quartz and $SiO_2$-glass (MIRWALD & LOERTING, 2011), may exhibit PVT anomalies. Also dehydration reactions e.g. of $NaCl*2H_2O$, $Mg(OH)_2$ (MIRWALD, 2005; 2008) and the compressibility of water (MIRWALD, 2005) indicate anomalous volume behaviour. All these studies base on high precision volumetric experiments ($\Delta V/V \sim 10^{-5}$) performed with a piston cylinder apparatus. A similar volumetric study was performed on cordierite from Soto/Argentina (MIRWALD et al., 1984) up to 1.5 GPa at 25 °C. Parallel, high precision XRD-data (cell volume) were collected with a diamond anvil cell (DAC). Cordierite shows a broad anomaly between 0.35 and 0,75 GPa what is strikingly similar to that one of the $SiO_2$ materials and also related to the

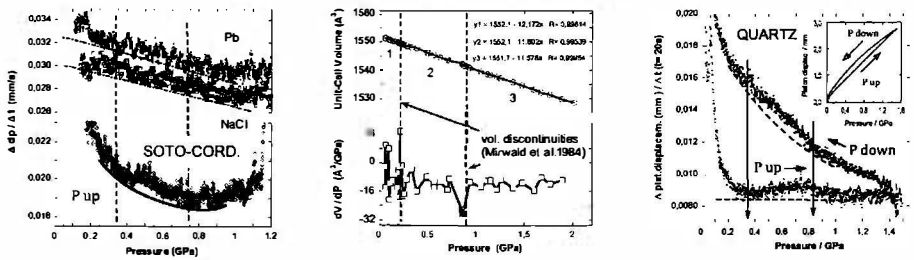


Fig. 1: the left plate displays the compression behaviour of cordieriteat increasing pressure, monitored in form of the piston-displacement ($\Delta pd/\Delta t$; $\Delta t$=15 s) versus pressure with the calibration tracks of Pb and NaCl; the middle plate shows the corresponding cell volume; the right plate gives previous data on quartz.

compressibility of water (MIRWALD, 2005). Furthermore, the ice melting curve (MIRWALD, 2010) and the dehydration reactions of the clathrates of Ne- and H-hydrates (DYADIN et al., 1999) as well as of $NaCl*2H_2O$ show anomalous dP/dT-slope behaviour in that pressure range. All materials studied so far have oxygen as a component in common which insinuates that oxygen is mainly responsible for that anomalous PVT-behaviour.

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